1. A method for determining the stability of a sample comprising a dispersion of solid or liquid droplet particles suspended in a liquid carrier, wherein an interparticle potential energy barrier inhibits neighboring particles from approaching each other closely enough to permit irreversible agglomeration due to strong, short-range attractive forces, said method comprising:

   applying a stress factor to said sample to reduce the height of said interparticle potential energy barrier so as to accelerate the onset of significant particle agglomeration; and

   detecting an increase in said particle agglomeration.

2. The method of claim 1, wherein said step of detecting the increase in said agglomeration comprises the use of a high sensitivity detector.

3. The method of claim 2, wherein said high sensitivity detector is a single-particle optical sensor.

4. The method of claim 3, wherein said detector is a single-particle optical sensor (SPOS).

5. The method of claim 2, wherein said high sensitivity detector comprises a detector sensing a value X responsive to said particles passing through a given region for a given time interval.

6. The method of claim 5, wherein said value X is a measure of the attenuation of light in response to the turbidity of said sample dispersion.

7. The method of claim 5, wherein said value X is a measure of the intensity of light scattered over a given range of angles from said particles of said sample dispersion

8. The method of claim 1, wherein said step of detecting the increase in said particle agglomeration comprises using sensitive, quantitative means for determining the extent to which said sample has become less stable by virtue of said application of said stress factor.

9. The method of claim 8, wherein said sensitive, quantitative means produces a particle size distribution (PSD) showing the concentration of particles as a function of size over a range of normal particle sizes and a tail of large-diameter outlier particles larger than said normal particle sizes and indicative of the increase in agglomeration.

10. The method of claim 1, wherein said stress factor reduces the surface charge on said particles by changing the pH of said sample.

11. The method of claim 10, wherein said particles have a net negative charge, and wherein said stress factor is an acid or buffered acid added to said sample to reduce the pH of said sample.

12. The method of claim 10, wherein said particles have a net positive charge, and wherein said stress factor is a base or buffered base added to said sample to raise the pH of said sample.

13. The method of claim 1, wherein said stress factor is an adsorbing electrolyte added to said sample allowing dissociated ions of appropriate charge to be adsorbed to the oppositely charged surfaces of said particles to reduce the net charge on said particles.

14. The method of claim 13, wherein said particles have a net negative charge and said ions dissociated from adsorbing electrolyte include positively charged ions that bind to the surfaces of said particles and reduce the net charge on said particles and thereby reduce said height of said interparticle potential energy barrier.

15. The method of claim 1, wherein said stress factor is a salt added to said sample, giving rise to dissociated, mobile ions that partially screen electrostatic repulsions between the charged particles, thus promoting their agglomeration.

16. The method of claim 15, wherein said stress factor is applied as a simple monovalent salt.

17. The method of claim 16, wherein said monovalent salt is sodium chloride.

18. The method of claim 1, wherein said stress factor is applied in successive increments at spaced time intervals resulting in successively higher stress levels in said sample being stressed and said step of detecting the increase in said particle agglomeration is repeated after each stress factor increment.

19. The method of claim 1, wherein said sample is divided into several batches, wherein said step of applying said stress factor to said sample comprises applying different levels of said stress factor to each batch, and wherein said step of detecting the increase in said

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particle agglomeration in each batch is performed after the passage of one or more time intervals Δt.

20. The method of claim 19, further providing a control batch of said sample, applying no stress factor to said control batch, and detecting the increase in particle agglomeration in said control batch after the passage of said time interval Δt.

21. The method of claim 19, wherein immediately after said application of said stress factor, there is a step of detecting the extent of particle agglomeration in each of said batches.

22. The method of claim 19, wherein said step of detecting the increase in said particle agglomeration further comprises measuring the PSD of each batch over an appropriate range of particle sizes and calculating the percentage of the dispersed phase (PDP) from each measured PSD.

23. The method of claim 22, further comprising computing the rate of change of said PDP with elapsed time for each said stress factor level.

24. The method of claim 23, wherein a figure of merit (FM) for said sample is derived from said rate of change of said PDP with elapsed time for a given stress factor level, whereby stable dispersions or emulsions will have relatively small values of FM and inferior, less stable, dispersions or emulsions will have relatively large values of FM.

25. The method of claim 22, further comprising computing the increase in said PDP per unit change in said stress factor level for a given value of elapsed time.

26. The method of claim 25, wherein a value of FM is derived from said increase in said PDP per unit change in said stress factor level for a given value of elapsed time, said elapsed time being sufficiently long to permit accelerated instability and particle agglomeration to be established, whereby the larger the value of a FM for a given value of elapsed time and level of applied stress factor, the less stable is said sample.

27. The method of claim 23, further comprising computing the increase in said PDP per unit change in said stress factor level for a given value of elapsed time.

28. The method of claim 27, wherein a value of FM is derived from said rate of change of said PDP with elapsed time for each stress factor level combined with said increase in said PDP per unit change in said stress factor level for a given value of elapsed time.

29. The method of claim 19, wherein said stress factor reduces the surface charge on said particles by changing the pH of said batches.

30. The method of claim 29, wherein said particles have a net negative charge, and wherein said stress factors are acid or buffered acid added in different concentrations to said batches to reduce the pH of said batches of said sample by different amounts.

31. The method of claim 29, wherein said particles have a net positive charge, and wherein said stress factors are base or buffered base added in different concentrations to said batches to raise the pH of said batches of said sample by different amounts.

32. The method of claim 19, wherein said stress factor is adsorbing electrolyte added to said batches of said sample allowing dissociated ions of appropriate charge to be adsorbed to the oppositely-charged surfaces of said particles to reduce the net charge on said particles.

33. The method of claim 32, wherein said particles have a net negative charge, and said ions dissociated from said adsorbing electrolyte include positively-charged ions that bind to the surfaces of said particles and reduce the net charge on said particles and thereby reducing said height of said interparticle potential energy barrier.

34. The method of claim 19, wherein said stress factor is salt added to said sample, giving rise to dissociated, mobile ions that partially screen electrostatic repulsions between the charged particles, thus promoting their agglomeration.

35. The method of claim 34, wherein said stress factor is applied as a simple monovalent salt.

36. The method of claim 35, wherein monovalent salt is sodium chloride.

37. The method of claim 19, wherein said steps of measuring said PSD of each batch are performed serially using a common detector, and wherein said passage of time Δt is different for each batch.

38. The method of claim 19, wherein said steps of measuring said PSD of each batch are performed in parallel using separate detectors.

39. The method of claim 38, wherein said passage of time Δt is the same for each batch.

40. A method for determining the stability of a sample comprising a dispersion of solid or liquid droplet particles suspended in a liquid carrier, wherein an interparticle potential energy barrier inhibits neighboring particles from approaching each other closely enough to permit irreversible agglomeration due to strong, short-range attractive forces, said method comprising:

applying a stress factor to said sample to reduce the height of said interparticle potential energy barrier so as to accelerate agglomeration of said particles;

detecting the increase in said agglomeration using sensitive, quantitative means for determining the extent to which said sample has become less stable by producing a particle size distribution (PSD) showing the concentration of particles as a function of size over a range of normal particle sizes and a tail of large-diameter outlier particles larger than said normal particle sizes indicative the increase in of agglomeration; and

calculating the percent of the dispersed phase (PDP) associated with said tail of large-diameter outlier particles from said measured PSD.

41. The method of claim 40, further comprising computing the rate of change of said PDP with elapsed time.

42. The method of claim 41, wherein a figure of merit (FM) for said sample is derived from said rate of change of said PDP with elapsed time for a given stress factor level, whereby stable dispersions or emulsions will have relatively small values of FM and inferior, less stable, dispersions or emulsions will have relatively large values of FM.

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43. The method of claim 40, further comprising computing the increase in said PDP per unit change in said stress factor level for a given value of elapsed time.

44. The method of claim 43, wherein a value of FM is derived from said increase in said PDP per unit change in said stress factor level for a given value of elapsed time, said elapsed time being sufficiently long to permit accelerated instability and particle agglomeration to be established, whereby the larger the value of FM for a given value of elapsed time and level of applied stress factor, the less stable is said sample.

45. The method of claim 43, further comprising computing the rate of change of said PDP with elapsed time.

46. The method of claim 45, wherein a value of FM is derived from said rate of change of said PDP with elapsed time for each stress factor level combined with said increase in said PDP per unit change in said stress factor level for a given value of elapsed time.

47. The apparatus for determining the stability of a sample comprising a dispersion of solid or liquid droplet particles suspended in a liquid carrier, wherein an interparticle potential energy barrier inhibits neighboring particles from approaching each other closely enough to permit irreversible agglomeration due to strong, short-range attractive forces, said apparatus comprising:

means supplying said sample to a test container;

means applying a stress factor to said sample in said container to reduce the

height of said interparticle potential energy barrier so as to accelerate the onset of significant particle agglomeration; and

means for detecting the increase in said particle agglomeration.

48. The apparatus of claim 47, wherein said means for detecting said particle agglomeration comprises a high sensitivity detector.

49. The apparatus of claim 48, wherein said high sensitivity detector is a single particle sensor.

50. The apparatus of claim 49, wherein said detector is a single particle optical sensor (SPOS).

51. The apparatus of claim 48, wherein said high sensitivity detector comprises a detector sensing a value X responsive to said particles passing through a given region for a given time interval.

52. The apparatus of claim 51, wherein said value X is a measure of the attenuation of light in response to the turbidity of said sample dispersion.

53. The apparatus of claim 51, wherein said value X is a measure of the intensity of light scattered over a given range of angles from said particles of said sample dispersion.

54. The apparatus of claim 47, wherein said means for detecting the increase in said particle agglomeration comprises sensitive, quantitative means for determining the extent to which said sample has become less stable by virtue of said application of said stress factor.

55. The apparatus of claim 54, wherein said sensitive, quantitative means produces a particle size distribution (PSD) showing the concentration of particles as a function of size over a range of normal particle sizes and a tail of large-diameter outlier particles larger than said normal particle sizes and indicative of the increase in agglomeration.

56. The apparatus of claim 54, wherein said high sensitivity detector comprises a detector sensing a value X responsive to said particles passing through a given region for a given time interval.

57. The apparatus of claim 56, wherein said value X is a measure of the attenuation of light in response to the turbidity of said sample dispersion.

58. The apparatus of claim 56, wherein said value X is a measure of the intensity of light scattered over a given range of angles from said particles of said sample dispersion.

59. The apparatus of claim 47, wherein said stress factor reduces the surface change on said particles by changing the pH of said sample.

60. The apparatus of claim 59, wherein said particles have a net negative charge, and wherein said stress factor is an acid or buffered acid added to said sample to reduce the pH of said sample.

61. The apparatus of claim 59, wherein said particles have a net positive charge, and wherein said stress factor is a base or buffered base added to said sample to raise the pH of said sample.

62. The apparatus of claim 47, wherein said stress factor is adsorbing electrolyte added to said sample allowing dissociated ions of appropriate charge to be absorbed to the oppositely charged surfaces of said particles to reduce the net charge on said particles.

63. The apparatus of claim 62, wherein said particles have a net negative charge and said ions dissociated from said adsorbing electrolyte include positively charged ions that bind to the surfaces of said particles and reduce the net charge on said particles and thereby reduce the height of said interparticle potential energy barrier.

64. The apparatus of claim 47, wherein said stress factor is salt added to said sample, giving rise to dissociated, mobile ions that partially screen electrostatic repulsions between the charged particles, thus promoting their agglomeration.

65. The apparatus of claim 64, wherein said stress factor is applied as a simple monovalent salt.

66. The apparatus of claim 64, wherein said stress factor is applied as a divalent or trivalent salt.

67. The apparatus of claim 47, wherein said means supplying said stress factor to said sample in said container is applied in successive increments at spaced time intervals, and wherein said means for detecting the increase in said particle agglomeration measures the increase in said particle agglomeration after each application of said stress factor increment.

68. The apparatus of claim 47 further comprising a plurality of said test containers, wherein said means for supplying said sample supplies said sample as separate batches in said plurality of test containers, and wherein said means applying a stress factor applies different levels of said stress factor to each of said batches in said test containers, and wherein said means for detecting the increase in said particle agglomeration detects the increase in said particle agglomeration after the passage of one or more time intervals Δt.

69. The apparatus of claim 68, further comprising an additional test container, said means for supplying said sample supplies a control batch to said additional test container, said means for applying a stress factor applies no stress factor to said control batch in said additional test container, and said means for detecting the increase in said particle agglomeration measures the increase in particle agglomeration in said control batch after the passage of one or more of said time intervals Δt.

70. The apparatus of claim 68, wherein said means for detecting the increase in said particle agglomeration further detects the extent of particle agglomeration in each of said batches immediately after said application of said stress factor to each of said batches.

71. The apparatus of claim 47, wherein said means for detecting the increase in said particle agglomeration comprises sensitive, quantitative means producing a particle size distribution (PSD) showing the concentration of particles as a function of size over a range of normal particle sizes and a tail of large diameter outlier particles larger than said normal particle sizes indicative of the increase in agglomeration, and wherein said apparatus further comprises means calculating the percentage of the dispersed phase (PDP) from said measured PSD.

72. The apparatus of claim 71, wherein said apparatus further comprises means for computing the rate of change of said PDP with elapsed time for each stress factor level.

73. The apparatus of claim 72, wherein said apparatus further comprises means for deriving a figure of merit (FM) from said rate of change of said PDP with elapsed time for a given stress factor level, whereby stable dispersions or emulsions will have relatively small values of FM and inferior, less stable, dispersions or emulsions will have relatively large values of FM.

74. The apparatus of claim 71, wherein said apparatus further comprises means for computing the increase in said PDP per unit change in said stress factor level for a given value of elapsed time.

75. The apparatus of claim 74, wherein said apparatus further comprises means for deriving a value of FM from said increase in said PDP per unit change in said stress factor level for a given value of elapsed time, said elapsed time being sufficiently long to permit

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accelerated instability and particle agglomeration to be established, whereby the larger the value of FM for a given value of elapsed time and level of applied stress factor, the less stable is said sample.

76. The apparatus of claim 72, further comprising means for computing the increase in said PDP per unit change in said stress level for a given value of elapsed time.

77. The apparatus of claim 76, further comprising means for deriving a value of FM from said rate of change of said PDP with elapsed time for each stress factor level combined with said increase in said PDP per unit change in said stress factor level for a given value of elapsed time.